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(56) Documents Cited

EP 0995668 A1

EP 0370342 A2

US 5888600 A

(58) Field of Search

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AT3P

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(54) Abstract Title

Composite structural element for vehicles and the like

(57) An element 1 of composite metal and plastic construction comprises a hollow support body 2 made of cupped plate with two side walls 2b finished with a folded edge 7, a framework 3 of plastic reinforcement ribs 3a, 3b in the support body 2, and means 5 for connecting the rib framework 3 to the support body 2 which form a connecting overlap 4a over the wall edges 7. The ribs 3a, 3b exceed the height of the side walls 2b and are linked by means of an overlap 4a from an outer covering of the support body 2 on the plate edges 7, anchored by means of buttons 6 projecting through holes. All the plastic elements are overmoulded to the support body 2 in the same plastic injection operation.

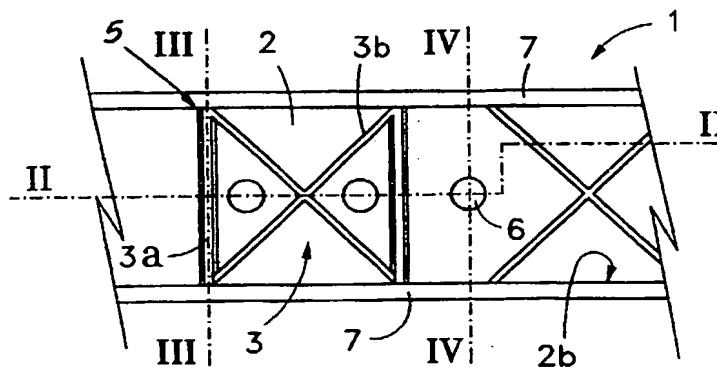


FIG. 1

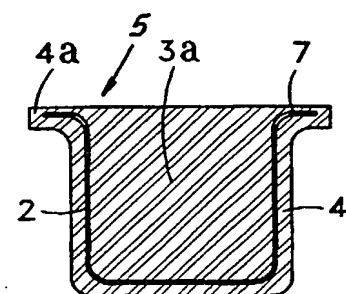


FIG. 3

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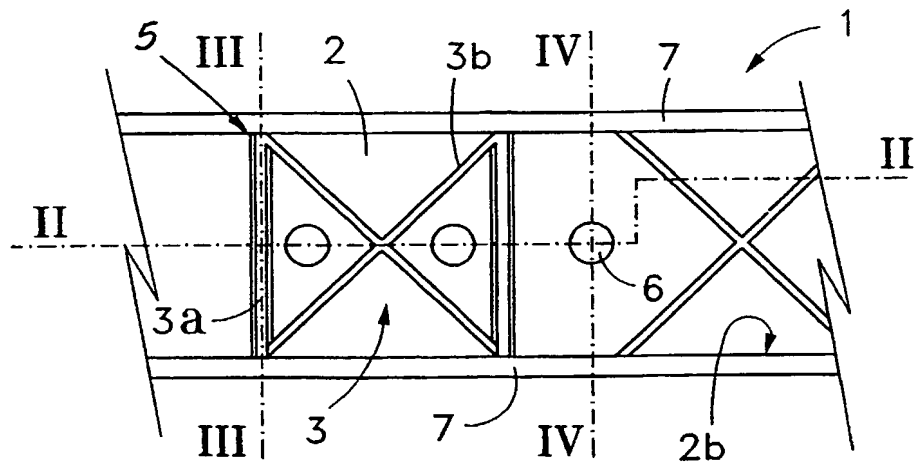


FIG. 1

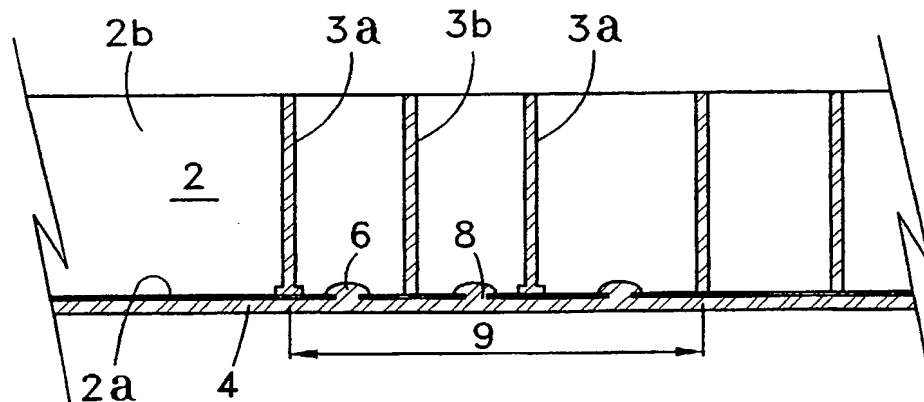


FIG. 2

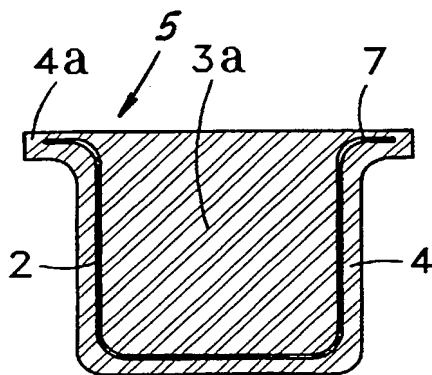


FIG. 3

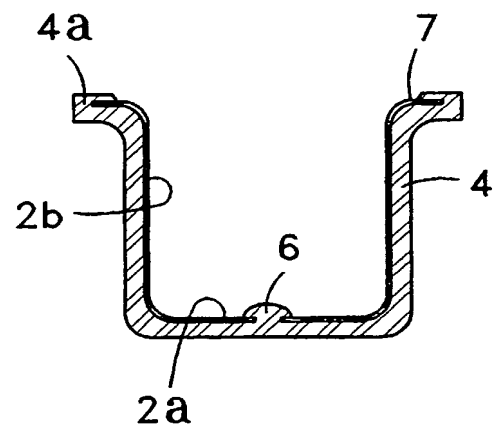


FIG. 4

# Composite structural element for vehicles and the like

The present invention relates to a structural construction element of elongated shape designed to withstand loads, made of metal and plastic materials by means of overmoulding, for its use in vehicles, household electrical appliances, furniture and the like, or more particularly, but not exclusively, for use as an element for building vehicles and the like.

10

An example of hollow beam in the form of a sheath, made on a hollow support body of cupped metal plate and with overmoulded plastic reinforcement ribs, is disclosed in EP-370342-B1. By means of the technique of overmoulding on a metal body a structural element is obtained, for instance for the building of automobile components, which, being light is also rigid and withstands compression loads well. The crossover and interlinked reinforcement ribs extend along the known construction element inside the hollow body, being joined to said plate side walls by means of anchorages of the same overmoulded plastic as the reinforcement ribs, which have been formed in the same moulding operation by way of through holes in said side walls.

25

The present invention provides a composite structural element of metal and plastic material, comprising:

an elongated support body made of metal plate, hollow and open on one side, with two side walls each terminating in a wall rim;

30

said plastic material incorporated into the support body by means of overmoulding, which includes a framework

of transverse reinforcement ribs inside the support body and an external covering of the support body;

means for connecting said plastic material part to the metal support body, made of the same plastic material  
5 during the moulding process;

wherein at least one part of said connecting means extends from said covering, linking to the reinforcement ribs above said rims of the support body side walls.

10 An embodiment of the present invention provides an elongated construction element composed of metal and plastic for support structures for vehicle components, household electrical appliances and other portable constructions.

15

The composite construction element according to the invention has an advantage over the known construction element in the arrangement of the reinforcement ribs in that they are simple and of small size due to the fact of  
20 not being conditioned by holes drilled in the metal base as in the above-mentioned prior art, thereby permitting a better adjustment of thicknesses.

An additional objective that is fulfilled by the invention  
25 due to the design of the anchorages is to facilitate separation of both materials, steel and plastic, in the process of grinding prior to recycling when it falls into disuse, which is achieved with the composite structural element.

30

An embodiment of the invention will now be divided with reference to accompanying drawings, of which:

FIG. 1 is a plan view of an elongated composite structural  
5 element.

FIG. 2 is a sectional view along line II-II of the construction element of figure 1.

10 FIG. 3 is a sectional view along line III-III of figure 1.

FIG. 4 is a sectional view along line IV-IV of figure 1.

In reference to figures 1-4, the mixed construction  
15 element represented as a preferred embodiment comprises a hollow support body 2 made of cupped plate and provided with a sealed lining and two side walls 2b, a framework 3 of reinforcement ribs 3a, 3b made of plastic overmoulded on the interior hollow of the support body 2, a covering 4  
20 of the same plastic as the ribs overmoulded in the same plastic injection operation on the outer surface of the support body 2, means 5 for connecting the rib framework 3 to said side walls 2b and means 6 for anchoring the covering 4 to the support body 2.

25

Being for instance of "U"-section, the support body 2 has two plain side walls 2b provided with a respective rim 7 (figures 1 and 3), which may be straight or bent outwards. The outer plastic covering 4 extends over the outside  
30 surface of the bottom 2a and of the two side walls and extends beyond the rims 7 of the side walls, forming on them an overlap 4a of plastic of the same covering during

the same overmoulding operation. The rib framework 3 comprises a series of transverse ribs 3a, 3b arranged in modules or independent of one another, spread along the support body at spacing intervals 9 determined in accordance with the distribution of loads to which they are subjected. Every one of said combined rib modules 3a, 3b comprises a pair of ribs 3a and two crossover ribs between the former. In one example of embodiment the framework 3 comprises only ribs 3a at right angles to the side walls 2b or crossover ribs 3b diagonal to them.

All the ribs 3a, 3b extend from the metal bottom 2a of the body, in contact with it, up to the height of the side walls 2b. Both types of ribs 3a, 3b project beyond the height of the side walls 2b and extend until joining the overlap 4a (figure 4) on the plate rims 7 enclosing the metal body 2 between the ribs 3a, 3b and the covering 4.

The bottom 2a of the support body has holes 8 between the ribs 3, or 3a and 3b, to let the plastic of the covering 4 pass during the overmoulding process to the support body 2 hollow and form on each one of the holes 8 an anchoring button 6 which attaches the covering 4 to the plate support body 2 and at the same time reinforces the union of the ribs 3a, 3b. The anchorage by means of buttons 6 is improved by means of a reshaping of the metal rims of the holes 8, not represented in the drawings.

CLAIMS

1. A composite structural element of metal and plastic material, comprising:

5 an elongated support body made of metal plate, hollow and open on one side, with two side walls each terminating in a wall rim;

said plastic material incorporated into the support body by means of overmoulding, which includes a framework  
10 of transverse reinforcement ribs inside the support body and an external covering of the support body;

means for connecting said plastic material part to the metal support body, made of the same plastic material during the moulding process;

15 wherein at least one part of said connecting means extends from said covering, linking to the reinforcement ribs above said rims of the support body side walls.

2. The structural element of claim 1, wherein the  
20 framework of reinforcement ribs comprises ribs that are either perpendicular or crossover in relation to the side walls of the support body, exceeding said side wall rims in height.

25 3. The structural element of claim 1, wherein the plastic material part projects towards the hollow interior of the support body by way of a plurality of holes in the support body, forming a series of anchor buttons.

30 4. A composite structural element of metal and plastic material, comprising:

an elongated support body made of metal plate, hollow and open on one side, with two side walls each finished with a wall rim;

a framework of reinforcement ribs extending  
5 transversely inside the support body, up to a height relative to the height of the side walls;

means for connecting the reinforcement rib framework to the metal support body, made of the same plastic and during the same moulding process as the reinforcement  
10 ribs, which extend over said side wall rims linking up with each reinforcement rib.

5. The structural element of claim 4, wherein the framework of reinforcement ribs comprises ribs that are  
15 perpendicular or crossover in respect of the support body side walls, exceeding the said wall rims in height.

6. The structural element of claim 4, also comprising an outer covering of the support body, made of the same  
20 plastic as the reinforcement ribs, from which said connecting means extend.

7. The structural element of claim 6, wherein said outer plastic covering projects towards the inside of the  
25 support body by way of a plurality of holes in the support body, forming a series of anchor buttons in the covering.

8. A composite structural element of metal and plastic material, comprising:  
30 a external covering of the support body, made of the same overmoulded plastic as said reinforcement ribs, and



means for connecting the reinforcement rib framework to the metal support body, made of the same overmoulded plastic as said external covering that extend from the latter linking to each reinforcement rib.

5

9. The structural element of any of claims 1 to 7, in which each wall rim includes a portion extending laterally outwardly from the wall.

- 10 10. A composite structural element for use as an element for building vehicles or the like, as is described substantially above here with reference to Figures 1-4 of the drawings.



Application No: GB 0126681.6  
Claims searched: 1 to 10

Examiner: Damien J Huxley  
Date of search: 2 May 2002

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:  
UK Cl (Ed.T): B5A: AB13, AB17, AT3P, AT12A, AT12P, ATXP  
Int Cl (Ed.7): B29C: 37/00, 39/10, 45/14, 65/00, 67/14, 67/18, 70/68, 70/70, 70/78, 70/88  
B62D: 29/00, 29/04  
Other: ONLINE: WPI, EPODOC, JAPIO

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	EP 0995668 A1 (BAYER AG) see the figures and WPI Abstract Accession Number 2000-305624.	1 to 10
X	EP 0370342 A2 (BAYER AG) see the figures and WPI Abstract Accession Number 1990-165108.	
A	US 5888600 (WYCECH) see the figures and line 36 of column 2 to line 11 of column 3.	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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